TECHNICIAN ENGINEER

MAY, 1969

MOSES LAKE WASH 98837
BOX 956
ROLAND KISSLER
545642 EWTE L 77

Published for the Employees of the Broadcasting, Recording and Related Industries

INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS — AFL-CIO

A BACKWARD GLANCE

What was it like in communications and science 50 and 100 years ago? The items below, culled from the electrical and broadcasting magazines of the Smithsonian Institution's Library in Washington and other sources of information, reveal a few surprises about "modern" technology, while exploring the byways of the industries that gave birth to broadcasting and recording.

10 YEARS AGO

Ten years ago, in 1959, the National Stereophonic Radio Committee was formed to analyze and test several proposed systems for FM stereophonic radio broadcasting. As a result of the studies conducted by this committee, the FCC later approved multiplexing.

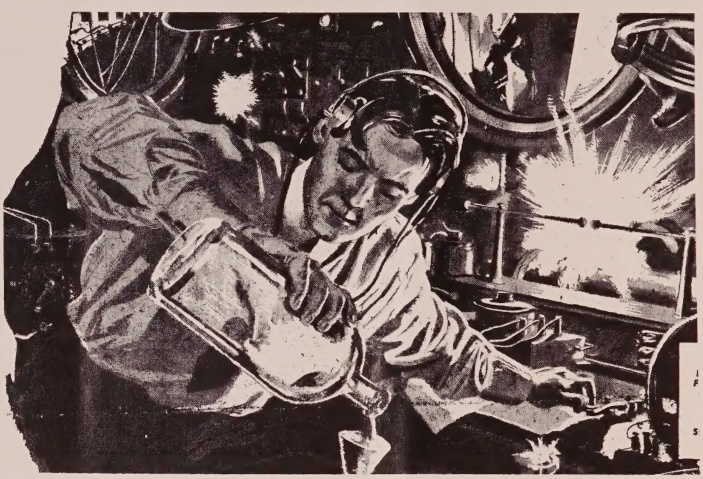
25 YEARS AGO

Military authorities and radio networks discarded traditional taboos on May 8, 1944, to cooperate in providing the American public with full and immediate reporting of the invasion of Europe by Allied Forces (which began June 6). The biggest on-the-spot reporting job of radio was thus launched. Five days after the invasion, the Allied Expeditionary Forces inaugurated a broadcasting service for troops just then establishing a beachhead on the European continent. Former NAB public relations director Col. Edward M. Kirby directed the radio service.

30 YEARS AGO

Maybe you'd prefer to forget it, but it was 30 years ago this month that Pepsi-Cola first introduced its now-famous jingle that revolutionized radio commercials. The Lord & Thomas ad agency encouraged the team of Allen Kent and Ginger Johnson to apply their talents to the writing of a musical message that would sell a 12-ounce bottle of cola for five cents. The result, using a frisky adaptation of the English hunting song, "John Peel," was this:

"Pepsi Cola hits the spot.
"Twelve full ounces. That's a lot,
"Twice as much for a nickel too.
"Pepsi-Cola is the drink for you!
"Nickel, nickel, nickel, nickel.
"Trickle, trickle, trickle, trickle . . ."



60 YEARS AGO

The life-saving capabilities of radio were demonstrated to the world early in 1909, by Jack Binns—who was later to become president of the Hazeltine Corporation—in a heroic episode at sea. The exploit was later turned into a movie.

Then a 25-year-old wireless operator on the big liner Republic, Binns was thrown from his bunk by a sudden jolt in the middle of the night. There was a crashing sound over his head, as a mast fell across the wireless shack. All the lights went out.

He stumbled to the door of the shack and saw, dim in the fog, the prow of another big ship jammed into the Republic amidship. One quick look told him the worst—the ship was going to sink. He felt his way back to the wireless set to find that his wireless set was broken. In the dark, he repaired it, only to find that the dynamos were flooded.

The storage batteries were dry and dead. He filled them with water. Finally he got a tiny spark, and then he set to work sending out the distress signal of the day, "QED, QED."

He later recalled that he didn't have too much hope for himself or for the 800 passengers on board, because no sets were carried on ships . . . even if there were ships in the vicinity.

An answer did come through from the Baltic, a liner capable of rescuing all the persons on board. Binns and the Baltic's operator stuck to their keys, trying to get the two ships together.

Finally, by setting off detonators at prearranged times, the ships were guided together and the rescue was made.

"It was a close shave," Binns recalled, "pouring water into a dry storage battery might not work again in a thousand years."

The INTERNATIONAL BROTHERHOOD OF ELECTRICAL WORKERS

CHARLES H. PILLARD — International President
JOSEPH D. KEENAN — International Secretary
HARRY VAN ARSDALE, JR. — International Treasurer

ALBERT O. HARDY — Editor, Technician-Engineer

TECHNICIAN ENGINEER

VOL. 18 NO. 5

in this issue

A Backward Glance 2
Patent Controversies in the History of Radio 4
The Labor-Management Whirl 7
14 Inventions That Won't Save the World 8
Pulsars: Sights and Sounds of the Universe 10
May Is National Radio Month 12
Technical Notes 14
Station Breaks 16

the cover

Inventor Lee deForest, shown with his responder (about 1904) and the famous Audion tube (patented 1908) against a background of his early wireless patents. The short history of radio has been clouded with a long and complicated maze of radio patent controversies—in which deForest has been a principal in several. The historic patent decisions made by the U.S. Patent Office have no doubt altered the direction of the radio industry many times. Read about some of important radio patent controversies in the story beginning on page 4.

index

For the benefit of local unions needing such information in negotiations and planning, here are the latest figures for the cost-of-living index, compared with 1968, April, 1968—119.9; April, 1969—126.4.

commentary

"We can't achieve a rule of law in this country unless we first rule out prejudices. Justice and order have a co-equal part of the great American equation. There is no doubt that in the brief time span of this Republic we have accomplished many things.

"We doubled human life expectancy. We created an optimum standard of living. We have given our people a degree of mobility that is unmatched in the history of the world. Yet we have not achieved as much as we could in human affairs. We must do everything in our power to make equal opportunity a reality and not just a promise. Not in five years, nor ten years or one year, but now.

". . . Can we really do it?

"My answer . . . is that if we can put a man on the moon, we can certainly put a man on his feet."

—Secretary of Transportation John A. Volpe, before the AFL-CIO Building and Construction Trades Conference, May 12, 1969

Published monthly by the International Brotherhood of Electrical Workers, AFL-CIO, 1200 Fifteenth St., N.W., Washington, D. C. 20005, for the employees of the broadcasting, recording, and related industries. Second class postage paid at Washington, D. C. Subscription, $2 per year.

Patent Controversies In the History

● "In a new and expanding field, there are almost inevitable numerous groups of near-simultaneous inventions.

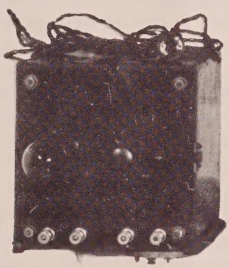
"It is the purpose of the United States Patent System to determine, if possible, who among the claimants deserve the legal credit for the invention and to allow him to benefit from it by giving him exclusive rights for 17 years. Because the rewards may be high, some protracted, bitter, exciting, and expensive controversies have resulted. The battleground is first the Patent Examiner's hearing rooms; later the courts.

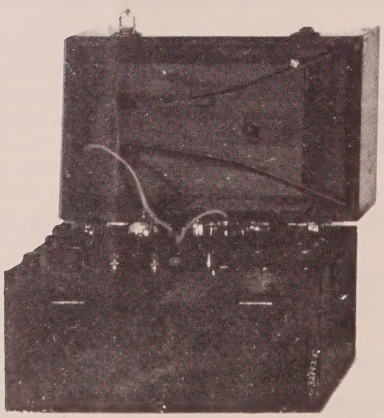
"Seldom has this been more true than in the history of radio, which grew up in such a way that the inventor was almost certain to be challenged, and a final decision was sometimes rendered long after the patent had run its course."

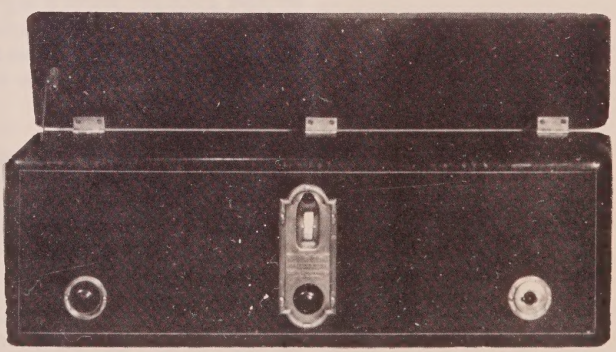
With these words the Smithsonian Institution launched its exhibition of inventions significant in radio and television progress. Entitled "Patent Controversies in the History of Radio," the exhibit has been on recent display in the Smithsonian's Museum of History and Technology in Washington, D.C.

Featured in the exhibition were inventions (and notes about patent controversies they generated) on: Four circuit tuning, the electrolytic detector, the vacuum tube, feedback circuit, superheterodyne receiver, the batteryless receiver, neutrodyne receiver, and "electronic" television.

"Without question, radio (including television broadcast by radio techniques) has been one of the greatest commercial phenomena of the 20th century," comments the Smithsonian's Division of Electricity and Nuclear Energy. "It is not surprising, therefore, that the various inventions that constitute its foundations should have been tested to the extremes allowed under the patent laws."







The batteryless receiver was contested in the patent courts during all its 17-year life span. It was the a-c power supply, and ones like it, that sparked the long Lowell & Dunmore vs. RCA patent litigation (left). Below left is an experimental batteryless receiver made in 1921. Below is RCA's Radiola 17 which was introduced in 1927 and became a quick success, permitting radio owners to throw away bulky batteries and power converters.

# of Radio

Litigations surrounding the eight inventions examined in the exhibition were so extensive that the Smithsonian staff went into detail in only two cases, that of the batteryless receiver, and "electronic" television.

Batteryless Radio

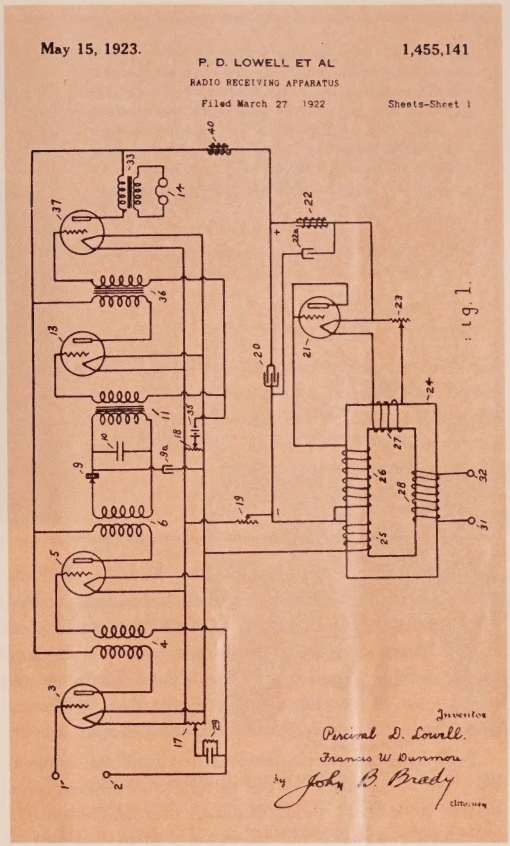
In the case of the batteryless receiver, the patent was litigated during its entire 17-year life-span.

It all began on March 27, 1922 when Precival Lowell and Francis Dunmore, National Bureau of Standards physicists, applied for a patent (Application Serial 547111) on a radio-receiver circuit that would permit the home radio listener to operate his set on alternating current or "light socket" power. The invention incorporated a method of energizing vacuum-tube filaments with alternating current and applying filtered direct current to the vacuum-tube plates.

Abandonment of bulky battery supplies was considered a significant technologic advance with commercial merit. The Patent Examiner, however, at first rejected the application, indicating that "prior art" [previous knowledge] in transmitter circuitry was sufficient to negate the invention. Lowell and Dunmore's attorney then amended and clarified the application to the satisfaction of the Examiner. Patent No. 1455141 was issued on Mar. 22, 1923. (See patent drawing at right).

From 1924 to 1931 there were four interference contests with rival inventors Michael Pupin, Robert Duncan, and Albert Blatterman. Due to the protracted litigation, companies were reluctant to invest in the Lowell and Dunmore invention. However, in 1924 the Dubilier Condenser Corp. obtained rights under the patent, and licenses were issued to several other firms. The Dubilier Corp. manufactured a Super-Ducon power supply for home radios: a "B" battery eliminator for supplying plate voltages. But because of technical difficulties, aggravated by lack of capital, Dubilier was not able to market a complete "light socket" receiver. Then in 1927, RCA introduced the Radiola 17—an immediate success. Dubilier sued RCA, claiming infringement of the batteryless-receiver patent. In 1929 a District Court ruled for Lowell and Dunmore but the decision was reversed by the Third Circuit Court of Appeals in 1932. The Supreme Court refused to review the case.

Meanwhile, in 1931, the interference cases had reached the Board of Appeals of the Patent Office, which ruled for Lowell and Dunmore. Then the U.S. Government



attempted to secure title to the patents because the receiver had been invented in a Government laboratory. The Supreme Court ruled for the defendants.

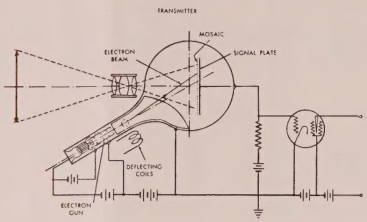
In 1933 Lowell and Dunmore filed disclaimers reducing the broad coverage of the patent. Dubilier sued the Baltimore Gaslight Co., claiming that the Stewart-Warner Model 109 Receiver infringed the Lowell and Dunmore patent. A District Court dismissed the complaint, indicating that the Lowell and Dunmore invention was based upon practice known to engineers prior to 1920. The Fourth Circuit Court of Appeals reversed the District Court in 1934 and remanded the case for retrial.

The Stewart-Warner interests petitioned the Supreme Court, which at first refused review, but in 1935 reversed itself and upheld the Fourth Circuit opinion. In the retrials and subsequent appeals (1936-38) through the Supreme Court, Lowell and Dunmore were unable to obtain reversals of lower-court opinions on validity of essential claims in the patent. Dubilier withdrew its financial support. RCA eventually bought the patent as insurance against further litigation.

Television Controversy

A patent was not issued for basic television until nearly 15 years of litigation was heard in various courts.

Television, too, was the source of several patent battles in its brief history. The iconoscope (drawing below) was the subject of several legal disputes, as was the case with the method of converting an optical to an electrical image. The latter involved Vladimir Zworykin and Philo Farnsworth. Farnsworth is shown with one of his early television receivers (right).



This legal tangle began when, on Dec, 29, 1923, Vladimir K. Zworykin of Westinghouse Manufacturing Co., filed for a patent (Application Serial 683337) on a television system using an image-type storage tube that became known as the "iconoscope." The Patent Examiner rejected most of the claims in the application, indicating prior art in previously issued U.S. and German patents.

Zworykin's attorney attempted to amend the application, but to no avail, as the Examiner discovered even earlier work that would invalidate the application. He particularly stressed the television system devised by Campbell-Swinton in England about 1911 and described in Marcus J. Martin's book, *Wireless Transmission of Photographs* (Isaac Pitman, 1921). Zworykin's attorney argued that the Campbell-Swinton system was never constructed and would not be operative anyway because the photosensitive surface in the camera tube was made of rubidium which would explode in air. The Examiner, maintaining that rubidium was not explosive in a vacuum or gas and that a rubidium mosaic could work well in a suitable tube, again rejected the application in November 1926.

While Zworykin was preparing to appeal this decision, some six contenders appeared on the scene with television systems incorporating one or more of his claims. Two basic interference actions resulted. The first was Zworykin vs. Schneider vs. Reynolds vs. Case vs. Farnsworth vs. Sabbah vs. McCreary on the photochemistry and physics of the image plate (mosaic) and associated circuitry. The seven-way interference underwent a complex series of legal maneuvers in several separate proceedings in the Patent Office.

By late 1928 all parties except Zworykin and Harold McCreary were adjudged to have abandoned action or to be ineligible for further consideration.

In 1929 the Examiner of Interferences ruled in favor of Zworykin. McCreary appealed to the Board of Appeals of the Patent Office, arguing that the Zworykin system was inoperative and based upon Campbell-Swinton, that electron scanning would melt the image plate, and that X rays would pose a serious problem. However, the Board of Appeals ruled otherwise; and Zworykin was again sustained in 1932 on McCreary's appeal to the Court of Customs and Patent Appeals.

The second basic interference action concerned the conversion of an optical to an electrical image, with associated scanning. Philo T. Farnsworth received a patent (No. 1773980) in 1930. Interference with Zworykin was declared in 1932.

In 1935 the Examiner of Interferences ruled that while Farnsworth had failed to establish that his invention was conceived prior to Zworykin's, Farnsworth was entitled to priority because Zworykin's device did not work in the manner claimed. The Examiner further explained that Zworykin's camera tube failed to produce a scanned electrical image. The Board of Appeals upheld Farnsworth in 1936. Shortly thereafter, the Patent Examiner for the Zworykin application informed the Westinghouse (Zworykin) attorney that most of the patent claims were invalid as a result of the interference action in Zworykin vs. Farnsworth and other prior art. However, Westinghouse requested a suspension of action while suit was instituted against RCA over H. J. Round's patent application, which had won favorable Patent Office action in other interferences. Zworykin, now working for RCA, was reluctant to testify in the case.

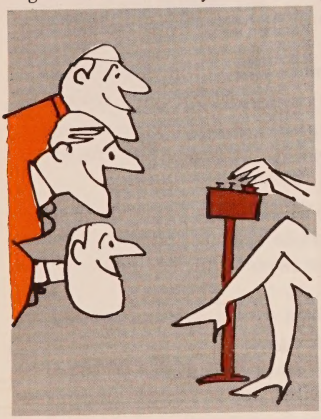
In 1938 the District Court for Delaware ruled in favor of Westinghouse and ordered that a patent be granted (No. 2141059). It automatically became available, however, to companies in the budding television industry under the terms of various cross-licensing agreements.

THE LABOR-MANAGEMENT WHIRL

As reported by Les Finnegan in CAVIL-CADE, *distributed by* Press Associates, Inc.

• *IN NEW YORK CITY, William F. Harris, a union window cleaner on strike with 3000 fellow unionists, told reporters, "I've known the heights and the depths of trade unionism." He meant that not long ago he worked as a sandhog and tunnel-digger, but today clings to the outside of buildings 30, 40 and 50 stories above Manhattan's roaring streets.*

• *IN PERUGIA, ITALY, union coal miners received an unexpected windfall, and from a most unexpected source, when they dug up the bones of a huge primitive mastodon which roamed across Italy 1,500,000 years ago. The miners were handed generous bonuses by the archelogy department of the University of Perugia.*



• *IN COLUMBUS, Ohio, a girl reporter's pretty knees disrupted the Ohio Senate and forced that legislative body to suspend work. It all started when Senate Majority Leader T. M. Gray asked Betty Work, United Press International reporter, to put on another dress instead of the miniskirt that hung six inches above her knees. Betty refused, the Majority Leader recessed the Senate, and called a meeting of the Ohio Legislative Correspondents Association. The OLCA upheld Betty and the right of reporters to wear whatever they want. Betty went back to her press table, and crossed her knees; the Senate resumed its session, and somehow the Senators survived the day.*

• *IN PROVIDENCE, R. I., taking a cue from professional baseball and football players, more and more college athletes have decided to organize. The first strike of a college track team occurred at Providence College last week when four members were suspended from the team for refusal to give up their television sets. All 12 track-and-field men promptly "withdrew their services" from the track team, forcing the college to cancel all its spring meets.*

• *IN LONDON, ENGLAND, a proposal to increase the paychecks of Navy girls by three cents a day for "good conduct" was denounced by Rear Admiral M. Morgan Giles. Addressing the House of Commons, Giles declared, "That's a ridiculous sum to give a girl for saying 'Yes, Sir' all day and 'No, Sir' all night!"*

14 Wonderful Inventions That Won't

by Dr. Peter Goldmark
President and Director of Research
CBS LABORATORIES

● "If you could dream up a dozen or so inventions that would make life more enjoyable—nay, even 'save the world'—what would they be?"

As a scientist and inventor—not such a rare breed in this modern era, which has cradled more than half the scientists who have lived on earth since the dawn of history—it is unusual for me to get through a dinner conversation without some one popping that question.

Of course, no scientist has to dream up crazy inventions anymore. Our civilization is giddy with gadgets already. By the year 2000, more than 5,000,000 patents will have been issued by the U.S. Patent Office, covering the average man's every conceivable—and inconceivable—need as thoroughly as the concrete of shopping-center civilization is gradually covering every blade of grass in what was America.

But that dinner-party question still persists: what are the inventions that can make life even more worth living? Technologically speaking, we do stand on the threshold of marvels even more dazzling than those we've seen. Here are a handful of those new blessings which many scientists believe are just over tomorrow's horizons:

● By the year 2000, experts predict that many Americans will be flying around in aerodynamic autos powered by fuel cells, batteries or atoms.

● Micro-electronics will produce an electron beam—a super liquid that can crumble a mountain of granite in a few minutes.

Reprinted from THIS WEEK *Magazine, Copyright 1969 by United Newspapers Magazine Corporation.*

● Miniaturization will enable the businessman of the future to carry equipment in his briefcase which today fills an entire room: video camera, electric typewriter, computer terminal, picture phone and tiny TV screen.

● Bio-engineers say that by the manipulation of DNA, the chemical substance important in genetics, they will be able to "engineer" physical and emotional makeup before birth.

● Climate-controlled cities will be covered by domes two miles in diameter.

● The endoscopic camera, embodying revolutionary principles of fibre optics, already permits light to bend around corners, twisting and turning through the abdominal cavity, photographing areas of the body never seen before without an operation. Imagine for yourself what fantastic medical and surgical advances this can lead to.

● Knowledge and memory pills will be administered to make people instantly conversant with any subject.

● Electric generators capable of supplying continents with power will be driven by the steady four- to six-knot current of the Gulf Stream.

● We will travel from Chicago to Tokyo in ½ hour.

● Undersea ranches will be operated by men able to breathe like fish, thanks to an artificial plastic gill attached to their lungs.

● Icebergs will be floated to the shores of arid nations as a source of fresh water.

● Micro-optics, which can reduce books to infinitestimal squares of microfilm, will be able to condense the 15,000,000 volumes in the labyrinthian Library of Congress into six small filing cabinets.

Save the World—and 2 that Might

• A laser directed from the ceiling towards a dinner plate will broil our steak.

• Pinhead-sized microcircuit radios (stereo, of course) will be planted in our ears.

These are some of the wonders predicted for our future. Will they, singly or in combination, increase man's happiness and peace of mind by one iota?

I am an inventor and I say no.

I say we already have inventions enough—now we must catch up with the inventions we already have. Our bathrooms are more luxurious than those of ancient Rome. We jet round the world faster than Caesar could march from Pompeii to Rome. But have our basic instincts and thinking processes improved?

If we could have push-buttoned our way to happiness, we would already have reached nirvana. I agree with Lord Ritchie-Calder, former professor of International Relations at the University of Edinburgh, in his nutshell summation:

"The great tragedy of science today is that we've got a great stockpile of knowledge and no philosophy."

In the humble opinion of this inventor, the only revolutionary finding that can possibly save man is the rediscovery and rededication of the simple dictates of his own heart. Its message must come through if we are to survive happily—that there's something more important than getting to Tokyo in a half hour, and that's looking out the window and enjoying the scenery along the way.

Let us begin with the basics. To change the world we must change ourselves. To change ourselves, we must change the way we deal with one another. Scientists have developed ways to communicate with astronauts circling the moon. What we need now is a better way to communicate, person-to-person, here on earth.

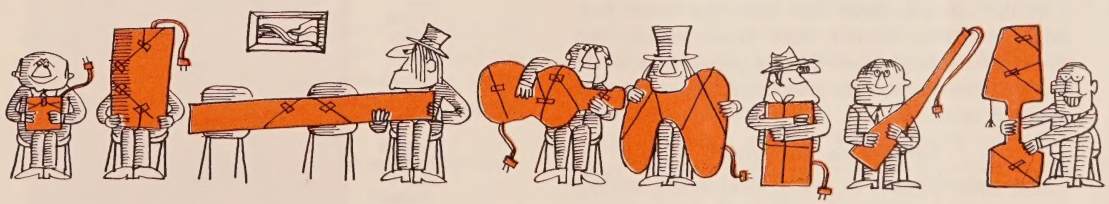
Perhaps I may be pardoned if I exercise my prerogative as a scientist to come up with two of my own candidates for "most-needed invention."

• The first is—*a new kind of parent.* I mean parents who, realizing that 50 per cent of their child's ability to learn takes place during the first four years of life—when the child is directly under parental influence—take the time and trouble to instruct and shape the young life.

We need parents whose example does not fill sons and daughters with the attitude that money, flashier cars and bigger houses are the only goals of life; who, instead of abdicating their responsibilities, are not afraid to set moral standards—ranging from respecting the needs and rights of others, to sex, LSD and violence on TV—and insist on respect and compliance no matter how "corny" and unpopular their standards may appear.

• We need *a new art of education,* to pour into every growing child—in such a way that he enjoys it—the accumulated knowledge of a thousand years so that he can cope with the 20th Century's technological problems and thrive as a human being. In the past 100 years, world population has almost tripled and the amount of knowledge that we have been accumulating has jumped 100-fold; but our education techniques have not kept pace.

It is not hardware, gadgetry or beautiful labor-saving devices that will give man the peace of mind he craves. History, as H. G. Wells once said, is a race between education and destruction. The future is here. We'd better catch up with it.



Astronomers use radio and TV broadcasters tools to uncover new celestial phenomena . . .

PULSARS: SIGHTS AND SOUNDS OF THE UNIVERSE

● Little more than a year ago scientists and radio astronomers detected a mysterious, pulsating radio-frequency transmission beamed through space. It was determined that the rythmic pulses came from a star hundreds of light years from the earth. Such extra-celestial radio activity sparked new research among astronomers around the world, and many individuals pondered the possibility of living beings from a far-off planet attempting to communicate with earthmen.

Scientists were quick to theorize, however, that the radio "messages" came from white dwarf or neutron stars now called *pulsars*. Since the first pulsar was discovered on February 28, 1968, three dozen radio pulsars have been pinpointed in the sky from various observatories.

Twinkle, Twinkle Little Star

In the accelerating search for additional radio pulsars in recent months, scientists became strongly convinced that—if their theories were correct—there should also be optical pulsars—similar stellar bodies which emit flashes of light.

The first discovery of optical signals was made at Steward Observatory in Arizona on January 16 of this year, originating from the vicinity of an already-discovered radio pulsar, identified as NP 0532 and located in the Crab Nebula. It is significant to note that television cameras played an important role in the discovery, just as radio apparatus have pinpointed and analyzed the radio pulsars.

The 36 pulsars now known to exist emit rhythmic pulses at radio frequencies and in some cases at such shorter wave lengths as those of visible light and X-rays. The pulse rates observer so far range from 30 times a second to once every 3.7 seconds.

In the relatively brief time since the initial find, astronomers have learned much about pulsars. One theorist, for example, feels that the pulsars may be the sources of cosmic rays, the most energetic particles ever observed on earth.

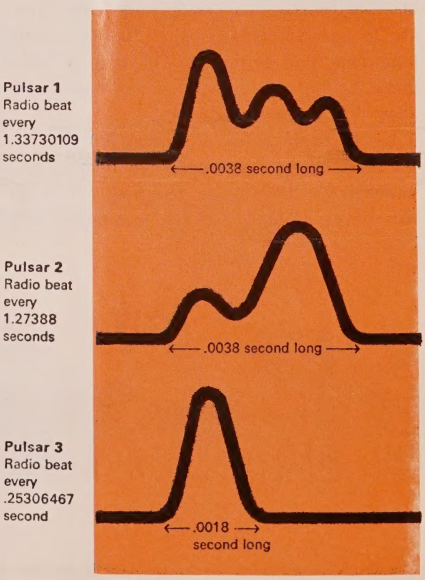
Conference on Pulsars

The state-of-the-art of pulsar hunting and analysis has progressed rapidly. The National Academy conducted a Symposium on Pulsars in Washington, D. C. recently where leading astronomers and scientists discussed and compared facts and findings. Men attending the special conference were generally agreed on theories and pulsar-studying techniques.

Participants in the symposium were virtually agreed that each pulsar has, as its core, a neutron star—an object that until very recently was known only as a far-out idea of a theorist. Initially, the scientists tried to establish a connection between white dwarf stars and pulsars. All attempts by various radio reception and recording techniques proved fruitless, however. Then an announcement of the discovery of a very short period pulsar strongly favored the neutron star theory, as against white dwarfs, as the possible generators of the pulses.

A neutron star is described as one that is collapsing under the weight of its own gravity, shrinking so much that it forms a dense mass which on earth would weigh ten billion tons per cubic inch. Stars vibrating in such death throes would perhaps emit such sounds as are reaching the radio telescopes of the astronomers.

The strange radio pulses were first noticed by a group of astronomers working with a new Cambridge University radio telescope in the summer of 1967. The weak,



varying signals received were first considered normal "noise" similar to that existing in the reception of any radio message. The interference received was soon isolated as not having come from taxi intercoms or other nearby signal sources, but was rather coming from some point outside the earth's atmosphere . . . and the search was on.

Breaking the Radio Code

Astronomers schooled in the use of radio telescopes knew that, for example, variation of the energy (or loudness) of a sound tells something about the temperature of the electrons which create a signal. A shift in wavelength gives the speed and direction of the emitter's motion. Armed with knowledge of this sort, the scientists pinpointed their first pulsar in January, 1968, and in rapid succession one after another was found. Each was given a designation by letters and numbers, the first one being CP 1919, for Cambridge (observatory where discovered) Pulsar at right ascension 19 hours 19 minutes.

In the case of the first pulsar (see illustration) the pulses usually show three peaks compressed within 37 milliseconds. The shape and relative intensity of the peaks usually vary from pulse to pulse. A series of strong pulses is usually followed by a series that is weaker by a factor of five. Moreover, the duration of the active periods varies with frequency, ranging from seconds at low frequencies to an hour or so at higher ones. The low-frequency component of the pulse invariably lags behind the high-frequency component. Electrons in interstellar space probably account for the delay. If the electron density is assumed to be one electron per 10 cubic centimeters, *CP.* 1919 must be about 420 light-years away.

Television Enters Search

In the case of optical pulsars, a new set of sleuthing tools had to be found. Just as radio proved to be the key to finding the pulsars, television must then be the logical piece of equipment for this hunt.

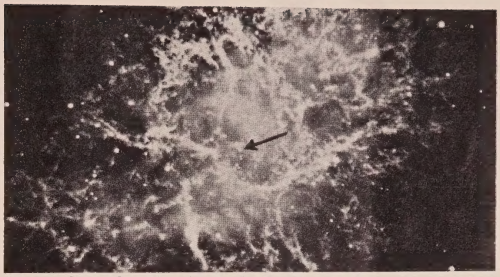
Actually several tools and techniques have been employed in the optical search. Here's a listing:

(1) Photoelectric photography with real time analysis of the signal. The photometer output is cycled into a multi-channel analyzer with a periodic frequency equal to that of the pulsating radio signal.

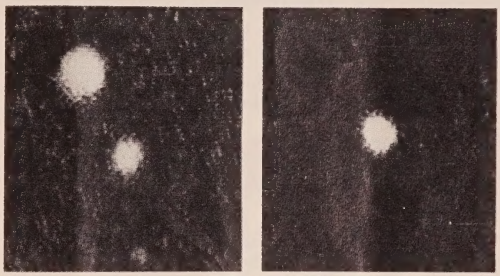
(2) Ordinary or image-tube camera in which the images are vibrated in synchrony with the radio pulse period. All normal stars will leave trailed images, whereas a pulsar, with its sharply defined light pulse, appears as one or more point images.

(3) Stroboscopic observations with a television looking through a rotating shutter.

The latter method has been most successfully used to study the first known optical pulsar, designated NP-0532 (N for Naval Research Laboratory). This pulsar



Arrow shows location in Crab Nebula of first optical pulsar sighting.



Optical pulsar close up. At left it is flashing; at right it is dark. (Lick Observatory Photos)

was found in the Crab Nebula (see photos) and has since been the subject of intensive study. This optical pulsar has, since its discovery, been found to have a double structure in X-rays, as well as in radio and light waves.

Even more recent finds have turned up radio pulsars which also give off rapid-pulsing, high energy gamma radiation. The recent discovery of the gamma ray-emitting pulsar, in the same portion of the sky as that of the one known optical pulsar, gives astronomers some new clues to the origin of the universe, and some new mysteries.

The gamma ray pulsar, according to its discoverers, is said to be the remnants of a star that exploded in the year 1045 A.D. in the Milky Way. It is believed that the energy of one pulse from the pulsar would equal the total energy that would be generated in 10,000 years of earth by all the world's electrical power plants working at their present rate. Scientists believe the pulses are made as the dying star, an extremely dense mass 12 miles in diameter, rotates 30 times a second. The find came from extensive computer analysis of data recorded two years by a Rice University balloon probe. At time of the flight, the existence of pulsars was unknown.

And the search goes on. Virtually every radio telescope in every country of the world is focused on the skies in search of more pulsars or for a better understanding of those already found. The radio and TV tools of the broadcaster have indeed become standard tools of the astronomer.

...Is National Radio Month

● The merry month of May is many things . . . but to broadcasters and knob-twisters it's National Radio Month. The theme, "Radio . . . The What's Happening Sound," is being promoted during the month by its sponsors, the 3400 member stations and four major network members of the National Association of Broadcasters.

Individual stations are participating with recorded Radio Month jingles and tie-in announcements, spots, and even speeches.

There is much to be said, at such a time as Radio Month, about the media and its place in our age.

It is interesting to note what the general public thinks and feels about radio, as reflected in a nationwide study conducted last year. Here's some of the facts the survey turned up:

—The two most popular types of programming on radio are news reports (preferred by 87 per cent of those interviewed) and music (77 per cent).

—Half of all radio listeners usually tune in to hear particular programs. Nearly 40 per cent do so just for the sheer pleasure of having radio on.

—Two-thirds of those interviewed report listening to one station most of the time and four-fifths have a particular program or station in mind before they tune in.

In recent years, radio has largely become a "news and music" medium. This is not to say, however, that there is anything monotonous about the manner in which the two are presented for broadcast. Take, for example, the experimentation now being done with new forms of news programming. One of the more offbeat approaches is found at a station near Los Angeles which has a poet-singer on its staff. He renders special commentary on some of the more dramatic news of the hour in ballads accompanied by a guitar and other musical instruments.

Other stations are going to all-news format on a round-the-clock basis.

Music is presented in just as versatile a manner as is the news. There's a music program—or more probably a radio station—that plays music as you like it, however you like it. There are stations that specialize in country and western music, or Spanish, or classical, or semi-classical, or pop, or rock.

The public is being told about other aspects of radio in Radio Month. The one facet of a station—which sometimes isn't even reflected in a programming schedule—that makes radio the "what's happening sound" is community involvement. Radio has come to be interested in what happens to people personally . . . their problems—large and small.

Stations have won awards for probing into drug addiction, birth control, the draft and other social problems. In Colorado, nearly 30 stations have joined in a unique experiment that goes far beyond the boundaries of a single community. They have created a "buckskin network" to get emergency messages to big game hunters isolated in the state's wilderness areas. The network has been so successful since it was started in 1962 that the idea has now spread to other states.

Community involvement and service takes many other forms. Some radio stations set aside time periods when citizens can call in complaints and ideas they want to bring to the attention of public officials. And some stations actively aid anyone who calls in a legitimate problem.

Because of radio's reach and influence, the government often calls on the medium for help during times of national crises. One such plea has come from Rosel H. Hyde, Chairman of the Federal Communications Commission. He has asked radio to assume part of the responsibilities for uniting the nation in a time of racial unrest. Calling on broadcasters to help "eliminate attitudes which divide our society," he said he believes the medium has the potential "to be the most effective unifying force available to man."

Mr. Hyde said that broadcasting cannot solve the problems of riots but can contribute "significantly toward healing the wound—toward furtherance of a feeling of national unity."

Broadcasters, sometimes at important economic loss, have concentrated much effort in this regard. A radio station in St. Louis has a plan called "Partners in Progress" through which it is providing newly established Negro-owned businesses in the ghetto with free advertising and on-air promotions. The station owner says the $250,000 worth of services being given is not charity since he expects the businesses he is helping to one day become some of his most successful paying accounts.

Radio is also helping the nation "cool it" in another way. The United Methodist Church is sponsoring a radio program dubbed "Night Call" which concerns itself with vital issues and quite often becomes a dialogue between the races. The one-hour of talk is carried live each week night by 90 stations across the country.

Another way that radio helps get things done for the community and the nation is by broadcasting editorials. A recent survey by the National Association of Broadcasters shows that 70 per cent of the adult population has heard editorials over the air, and a sizeable number of those who have would like more of them.

The main value people see in broadcast editorials is that they inform and educate them about current issues. About four-fifths of those aware of broadcast editorializing, a survey found, report that aired editorials have made them think more about the subject. One-half say that broadcast editorials helped them make up their minds about an issue. One-quarter feel that on-air editorials got them to change their minds. And one-seventh say they caused them to do something about the subject of the editorial.

Broadcast editorials also have an influence on our elected officials. One radio editorial persuaded a governor not to abolish measures for consumer protection. Another prodded a state legislature into voting funds for a treatment center for alcoholics. And still another prevented the closing of a state's mental-health day-care centers. Radio editorials certainly make things happen.

The power of radio can be illustrated in yet another way—dollars and cents. Radio has the power to effectively move products and services through advertising.

In 1968, revenues from radio advertising reached an all-time high . . . totalling more than one billion dollars. In reaching this impressive milestone, radio outstripped all other major advertising media. Radio sales climbed 12 per cent last year, compared with a gain of 9 per cent for television, 5 per cent for newspapers, 3 per cent for magazines and 10 per cent for outdoor advertising.

The businesses that advertise on radio do so because they know it's a mover. It not only moves ideas, it moves listeners to nearby stores to move merchandise off shelves. Radio advertising also creates demands for more services of all kinds.

Radio's role in modern America . . . and in America's future . . . is indispensable. It informs, interprets, influences and entertains with superb agility.

Status of the U.S. Merchant Marine Fleet:

'OUR SHIP IS SUNK'

● With all the current interest in the position of the United States in world trade involving the merchant marine, comments by two members of the House of Representatives clarify the issues.

Representative Jacob Gilbert (D-N.Y.) takes note of a recent announcement from Lloyds Register of Shipping. "It said the total tonnage of ships launched during 1968 was an all-time world's record for the third straight year—but the United States was in tenth place, trailing such small nations as Denmark and Spain.

"Lloyds reported that Japan, again the world's leading shipbuilder, launched 17,000,000 tons of shipping

last year. The U. S., once the world's shipbuilding leader, launched 441,000 tons. This was only 2.6 percent of the total launched by Japan.

"That is one reason, of course why the United States has lost its supremacy of the Seven Seas."

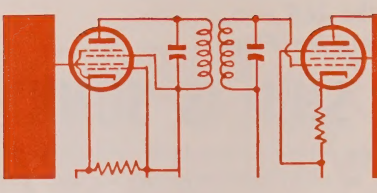
Congressman Thomas P. O'Neill (D-Mass.) is more to the point. He says, "The United States has now sunk—and very likely that is the best way to describe it: 'sunk'—to the point where our merchant marine fleet today is less than 20 percent, less than one-fifth, its size 20 years ago. More appalling is the fact that today nearly 95 percent of all our foreign commerce—inports and exports—is carried by ships flying foreign flags.

"At the same time the Russian fleet has increased enormously: from 21st among the fleets of the world in 1950 to the fifth largest today."

Actors' Guild Pioneer, Alan Mowbray, Dies

The death of veteran actor Alan Mowbray in Hollywood at the age of 72 brought to light a fascinating trade union story.

It was Mowbray's personal check for $50 which paid for the incorporation of the Screen Actors' Guild in 1933. One of the Guild's founders, Mowbray held Membership Card No. 4.



TECHNICAL Notes

HEART TRANSDUCER DEVELOPED

A basic research program on electronics materials at NASA has led to the development of a rugged, tiny device that may eventually be implanted in the human body to measure blood pressure.

A simple semiconductor transducer, it is believed to be the smallest of its kind ever fabricated. Only about two 100ths of an inch thick, it uses less than 50 millionths of a watt of electric power. The device is capable of transmitting pressure variations which provide the medical researcher with information about heart and blood circulation.

The medical importance of the device, which is called a cardiovascular pressure transducer, was established by a medical team headed by Dr. Bernard Lown, Associate Professor of Cardiology at the Harvard School of Public Health, in collaboration with NASA.

The device has been successfully tested by inserting it into the heart and arteries of animals.

Dr. Lown said that the NASA development is a significant advance in monitoring blood flow changes, which is especially important in cardiac patients, particularly those with coronary occlusions.

Flash! PROGRESS MEETING—San Diego, July 22-24

COLOR TV IN BRITAIN

What's the TV picture in Great Britain? Well, color it slowly, say the observers.

Full-color television service in the British Isles had been predicted by November 15, 1969, but the General Post Office—responsible for installation of connecting links between stations—says it will not be ready on a fully-operational basis before early 1970.

Set manufacturers and advertisers in England had geared their efforts for a "colorful" 1969 Christmas season over what they consider a major failure in meeting the November target date. Paul Fox, controller of the British Broadcasting Corporation's TV1 announced last May that full color TV service would begin in time for Christmas programming, which in turn would give a big seasonal sales boost to color TV sets.

According to broadcast sources, the "misunderstood target dates" was a matter of "bad communications between industry, Independent Television Authority, the BBC and GPO. It's the old story of the left hand not knowing what the right is doing."

VIDEOTAPE DUPLICATION FASTER

IBM Research Laboratories reports that it has developed a new, much faster method of duplicating TV videotapes, likened to "making a contact print from a photographic negative. The development was first reported at a Society of Motion Picture and Television Engineers in Miami.

The IBM system duplicates a one-hour tape in three minutes with "virtually undectectable loss in fidelity." A heavily-coated master tape is passed through a high-frequency field which impresses the program on the duplicate that is clamped to the master. The developer speculates that when the system becomes commercially available, the use of videotape for commercials and syndicated programs will radically increase.

Flash! PROGRESS MEETING—San Diego, July 22-24

SPECIAL CATV SETS COMING

Hamlin International Corp., Seattle, has announced the availability of a new 25-channel, 19-inch TV receiver designed especially for lease to cable-TV subscribers.

Described by the manufacturer as "the ultimate in CATV," the "practical CATV terminal device" could be "leased and serviced by the cable operator."

The set incorporates the existing 25-channel Hamlin converter as its tuner. It also contains a high gain audio circuit to overcome the sound suppression practiced by most cable TV systems.

Shipments are expected to start this fall, selling for about $270 each in quantities of 1000.

Flash! PROGRESS MEETING—San Diego, July 22-24

IS SOMEONE WATCHING YOU?

The big three-screen, color, remote-controlled TV monitoring console used in the White House during the Johnson Administration is gone . . . but it hasn't gone far.

President Nixon ordered the network-monitoring complex removed from the Oval Room when he took up residence at 1600 Pennsylvania Avenue in Washington, D. C.

The monitors won't go unused, however. The Signal Corps designed monitor—which had permitted LBJ to watch all three major networks simultaneously—now reposes in the office of Nixon's Director of Communications, Herbert G. Klein, who indicates that it will be used to monitor network news programming.

DIRECT SATELLITE-TO-HOME TV

Hearings have begun by a House Foreign Affairs subcommittee on space broadcasting. Comsat and NASA witnesses were heard, as well as former USIA head Leonard Marks.

The House Subcommittee on National Security and Scientific Developments, under the chairmanship of Rep. Clement J. Zablocki (D-Wisc.), is looking into the foreign policy implications of space broadcasting.

As direct-to-home satellite broadcasting becomes operational, the Congressman noted, "for the first time in history a nation (can) present its case directly to the people of an enemy country on television and in color.

The Congressional group will also examine the role of Intelsat in space broadcasting, the possible uses of a planned French satellite that will have the east coast of the U.S. within its range and a planned educational television satellite for use in India.

Flash! PROGRESS MEETING—San Diego, July 22-24

NEW LABOR FILM AWARDS

A movie festival on jobs, training and the ghetto has been established and winners will receive A. Philip Randolph awards, in honor of the Negro labor leader. The awards were recently announced by Theodore Kheel, president of the sponsoring organization, the American Foundation on Automation and Employment.

More than 250 films have been entered in the fair by community organizations, unions, industry and other groups in the U. S. and abroad. The 50 finalists will be judged by union leaders, industry, education, community executives and filmmakers.

Four categories are included: on-the-job training, preparation of employers and ghetto residents for the "world of work," understanding problems of minority communities, and orientation of black and Spanish-speaking employers and employees.

BLAME IT ON TV

Television (and the jet airplane) is "homogenizing and Americanizing the world," says Thomas J. Swafford, vice president of the CBS Television Services Division.

Swafford, speaking recently to the national packaging conference of the American Management Association in Chicago, disagreed with those experts who feel the world will continue to comprise separate markets despite the influence of international communications satellites and the rising flood of tourists around the world.

He noted that American-produced TV programs are viewed in over 100 countries, and that the American influence is spreading ever more rapidly. TV is the medium being used to bring American-made products into the living rooms in "what used to be far-away places," says Swafford.

Flash! PROGRESS MEETING—San Diego, July 22-24

MOON IN LIVING COLOR

Eleven color TV transmissions were sent from the Apollo 10 spacecraft during the astronauts' eight-day lunar mission late in May. The astronauts carried a Westinghouse-built camera, incorporating a field-sequential color-scanning wheel to provide color views of the moon and of the earth. The camera, using a low-light-level secondary electron conduction imaging tube, is 17 inches long and 10 inches high. The 10-pound camera draws about three watts of power.

The camera has a tiny monitor so that the astronauts can view the camera's target. The monitor measures about 6 x 4 inches in size and carry a 2 x 2¾-inch screen.

Color views were transmitted on a slow-scan mode. Both the color and slow-scan were converted into commercial U.S. color and frame standards for network usage at the NASA Goldstone (California) station. Apollo 10 also carried an RCA black-and-white camera as back-up.

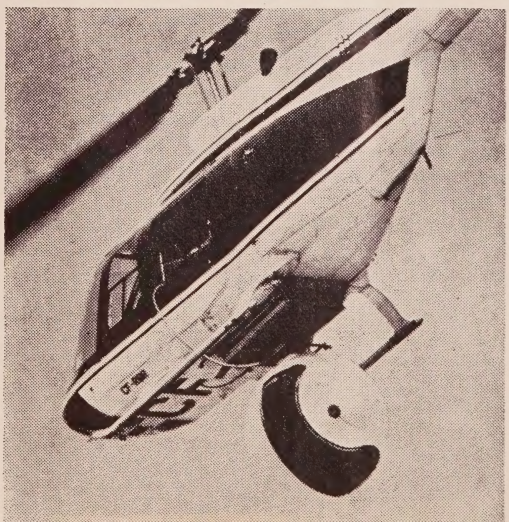
TV CAMERA MOUNT DESIGNED FOR AERIAL SURVEILLANCE

A vibration-free TV or motion picture camera mount has been developed for use when shooting from helicopters, planes, boats, truck or other mobile bases. Designed and built by Canadian Westinghouse, the system consists of a gyro-stabilized platform on which is mounted the camera inside a ball-shaped housing. The "ball" is then mounted outside the moving vehicle.

The device can be panned through 360 degrees or tilted to a maximum of 90 degrees.

A reflex viewfinder is linked via closed-circuit television to a video monitor inside the moving craft to permit cameramen to see the subject being shot.

The system is being marketed in the United States and Canada by John Lowrey Productions, Ltd., of Hollywood, California, and Toronto, Ontario, under the name of Wesscam stablized camera mount.



STATION BREAKS

PUBLIC TV'S ADULT EDUCATION

The Corporation for Public Broadcasting will study the contributions possible by public television and radio broadcasting in the field of continuing adult education.

The CPB study will be completed by September. It is being conducted by the National Instructional Television Center, which is investigating existing adult education programs and will evaluate their development and effect. Troughout the study, NITC will work with the Educational Television Stations Program Service and the National Educational Radio Network of the National Association of Educational Broadcasters.

Flash! PROGRESS MEETING—San Diego, July 22-24

TWO STATIONS BAN TOBACCO ADS

Television stations WTOP-TV in Washington, D. C., and WJXT, Jacksonville, Florida, have announced that they will stop accepting cigarette advertising June 1, in accordance with a Federal Communications Commission recommendation.

FCC Chairman Hyde says that "these are the only major television stations that I know of who have taken this step."

WTOP-TV and WJXT are owned by the Washington Post Co. The stations, who are part of the CBS network are committed to commercials for this fall, but—says WTOP Vice President and General Manager John Corporan—"after that committment is fulfilled, Post-Newsweek stations will cover," that is, run another commercial when the network runs a cigarette commercial.

The ban will also apply to the WTOP AM and FM stations in Washington.

Flash! PROGRESS MEETING—San Diego, July 22-24

WINDSOR SPORTS FANS

Hell has no fury like a spurned sports fan. An independent television station in Windsor, Ontario, felt the wrath of an irate sports enthusiast recently. About 200 families from the surronding area and station employees were evacuated temporarily after a vandal cut a guy wire to the station's 650-foot tower with a hacksaw.

The top 50 feet of the tower sagged but was later winched back into place without toppling, after an employee noticed the tower near the downtown area leaning about 10 degrees.

Station officials were checking a letter received two weeks earlier that threatened to topple the tower unless more National Hockey League games were broadcast.

WKBD-TV (UHF) ON PARITY WITH VHF

What many VHF stations have feared for so long has come to pass in Detroit. UHF Station WKBD-TV has announced that it had topped its independent competition in the Windsor (Ontario)-Detroit viewing area.

According to the Kaiser Broadcasting station, the February-March 1969 American Research Bureau survey of the market shows WKBD-TV leading with an audience of 43,400 viewing households in prime time.

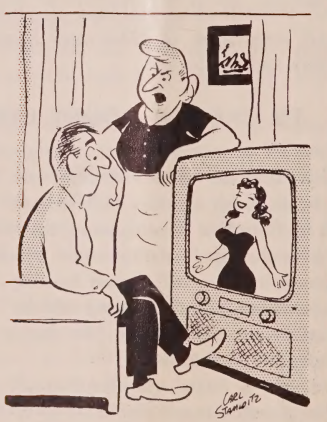
Of course, the network affiliates in Detroit show TV households that are from three to seven times these figures (in prime time upwards from 250,000).

The station is quite proud of its record, however, considering that when it first signed-on in 1965, only 19 percent of Detroit's TV households were UHF-equipped. The latest ARB report shows a 76 percent all-channel set capability in the market area.

Technical employees of Station WKBD-TV are represented by IBEW Local 1218.

Flash! PROGRESS MEETING—San Diego, July 22-24

LAST LAUGH



"Is this the eminent union labor leader you were so anxious to listen to?"